

**WHAT IS CLAIMED IS:**

1. A multi-mode bi-directional communications device, comprising:
  - a diplexer having a high-pass filter, a low-pass filter, and
  - a notch filter selectively coupled to the low-pass filter in response to indicium of
- 5 a desired spectral region.
2. The device of claim 1, further comprising upstream processing circuitry and downstream processing circuitry coupled to said diplexer.
- 10 3. The device of claim 2, wherein the downstream processing circuitry comprises:
  - a tuner;
  - a demodulator;
  - a first SAW filter selectively coupled between said tuner and said demodulator;
- and
- 15 a second SAW filter selectively coupled between said tuner and said demodulator.
4. The device of claim 3, wherein the first SAW filter has a bandwidth of 6MHz and the second SAW filter has a bandwidth of 8MHz.
- 20 5. The device of claim 3, further comprising at least one selector for selectively coupling the first SAW filter and the second SAW filter between the tuner and the demodulator.
6. The device of claim 3, wherein said high-pass filter is coupled to said tuner.
- 25 7. The device of claim 1, wherein said high-pass filter passes signals greater than 88MHz.
8. The device of claim 2, wherein said upstream processing circuitry is selectively
- 30 coupled to one of said low-pass filter and said low-pass filter in conjunction with said notch filter.

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9. The device of claim 1, wherein the low-pass filter nominally passes signals less than 65MHz, and passes signals less than 42MHz when the notch filter is coupled thereto.

10. The device of claim 1, wherein at least one switch is used to select the notch filter.

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11. The device of claim 10, wherein the at least one switch is selected from the group consisting of a transistor, a PIN diode, a diode, and an electro-mechanical switch.

12. The device of claim 1, wherein said device is selected from the group comprising a  
10 cable modem and a satellite terminal.

13. The device of claim 1, wherein said device supports multiple standards selected from the group consisting of the North American Data Over Cable Service Interface Specifications (DOCSIS) or the European DOCSIS standards.

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14. A diplexer, comprising:

- a high-pass filter coupled between a first signal port and a second signal port;
- a low-pass filter coupled between a first signal port and a third signal port; and
- a notch filter, selectively coupled to the low-pass filter in response to indicium of

20 a desired spectral region.

15. The diplexer of claim 14, wherein said low-pass filter comprises:

- a first plurality of inductors connected in series between said first and third signal ports, each of said inductors being coupled to ground via a respective capacitor
- 25 forming thereby a plurality of single pole filter elements, a portion of said inductors being bypassed by respective capacitors; and

said notch filter comprises:

- a second plurality of inductors, where each inductor is respectively
- coupled between a portion of the capacitors of the single pole filter elements of
- 30 the low-pass filter and ground.

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16. The diplexer of claim 14 wherein said high-pass filter comprises:  
a plurality of capacitors connected in series between said first and second signal ports, each of said capacitors being coupled to ground via serially coupled circuit elements forming thereby a plurality of single pole filter elements, each of said serially  
5 coupled circuit elements comprising a capacitor and inductor.
17. The diplexer of claim 14 further comprising a selector for selectively coupling the notch filter to the low-pass filter.
- 10 18. The diplexer of claim 14, wherein the selector comprises at least one switch selected from the group consisting of PIN diodes, transistors, and electro-mechanical switches.
19. The diplexer of claim 15 wherein the selector comprises:  
a plurality of PIN diodes respectively coupled in parallel with said second  
15 plurality of inductors, wherein said PIN diodes are adapted for connection to a control signal for selectively biasing the PIN diodes to couple and decouple the notch filter to the low-pass filter.
20. A method of passing bi-directional communications signals of differing modes  
20 through a diplexer having a high-pass filter coupled between a first and a second signal port, a first low-pass filter selectively coupled to a notch filter, said low-pass filter coupled between the first and a third signal port, comprising:  
receiving downstream signals at the first signal port;  
filtering the received downstream signals using said high-pass filter;  
25 communicating filtered downstream signals to the second signal port;  
receiving upstream signals at the third signal port;  
selectively coupling said notch filter to the low-pass filter for filtering the received upstream signals in response to a desired communications mode; and  
sending the filtered signals to the first signal port.